

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1-12 (Cancelled).

13. (New) A method for determining blood recirculation comprising:

 withdrawing blood from a patient's body through a withdrawal line;

 returning blood into the patient's body through a return line;

 inducing a disturbance in the blood flowing in the return line, said disturbance having a succession of increases and decreases of a value of a blood parameter around an average value or around a predetermined profile; and

 determining a blood recirculation value in a vascular access of the patient between the return line and the withdrawal line, as a function of a disturbance in the withdrawal line.
14. (New) A method according to claim 13, wherein the blood recirculation value is determined as a function of at least first and second values of said blood parameter in the blood flowing in the withdrawal line, said first value being measured during a first cycle of increase and decrease of said succession, and said second value being measured during a second cycle of increase and decrease of said succession.
15. (New) A method according to claim 13, wherein the blood recirculation value is determined as a function of at least first and second values of said blood parameter in the blood flowing in the return line, said first value being acquired during a first cycle of increase and decrease of said succession, and said second

value being acquired during a second cycle of increase and decrease of said succession.

16. (New) A method according to claim 13, wherein the blood recirculation value is calculated by means of a linear first order model, said model having parameters estimated using a method of least squares.

17. (New) A method according to claim 13, wherein said disturbance is continuous.

18. (New) A method according to claim 13, wherein the blood recirculation value is calculated on the basis of a series of values assumed by said blood parameter within a predetermined time window.

19. (New) A method for determining blood recirculation comprising:

withdrawing blood from a patient's body through a withdrawal line;

returning blood into the patient's body through a return line;

inducing a succession of variations of a value of a blood parameter in the blood flowing in the return line, each variation having an increase and a decrease of said blood parameter value;

acquiring at least a first value of said blood parameter in the blood flowing in the withdrawal line for at least a first variation;

acquiring at least a second value of said blood parameter in the blood flowing in the withdrawal line for at least a second variation; and

determining a blood recirculation value in a vascular access of the patient between the return line and the withdrawal line, as a function of said at least first and second acquired values.

20. (New) A method according to claim 19, further comprises measuring said first value during said first variation.
21. (New) A method according to claim 19 or 20, further comprising measuring said second blood parameter value during said second variation.
22. (New) A method according to claim 19, wherein the blood recirculation value is determined as a function of at least first and second values of said blood parameter in the blood flowing in the return line for at least said first and second variations.
23. (New) A method according to claim 22, wherein said first and second values of said blood parameter of the blood flowing in the return line are measured values or set values.
24. (New) A method for determining blood recirculation comprising:
- withdrawing blood from a patient's body through a withdrawal line;
 - returning blood into the patient's body through a return line;
 - inducing a succession of variations of a value of a blood parameter in the blood flowing in the return line, each variation having an increase and a decrease of said blood parameter value;
 - acquiring, for each variation, at least a first value of said blood parameter of the blood flowing in the return line and at least a first value of said blood parameter of the blood flowing in the withdrawal line; and
 - determining a blood recirculation value in a vascular access of the patient between the return line and the withdrawal line, as a function of said blood parameter values, said blood parameter values being acquired for a variation and for one or more temporally preceding variations.

25. (New) A method according to claim 24, wherein said acquired values of said blood parameter of the blood flowing in the return line are measured values or set values.

26. (New) A method according to one of claims 13, 19, or 24, wherein said blood parameter is either the hemoglobin concentration or the blood temperature.

27. (New) A method according to one of claims 13, 19, or 24, wherein said blood parameter is the hemoglobin concentration and said succession of increases and decreases of the hemoglobin concentration is caused by varying at least one of:

- an ultrafiltration flow ultrafiltered in a blood treatment device arranged between the withdrawal line and the return line;
and

- an infusion flow infused into the extracorporeal blood.

28. (New) A device for determining blood recirculation comprising:

- a withdrawal line for withdrawing blood from a patient's body;

- a return line for returning blood into the patient's body;

- means for inducing a succession of increases and decreases of a value of a blood parameter around an average value or around a predetermined profile in the blood flowing in the return line; and

- means for determining a blood recirculation value in a vascular access of the patient between the return line and the withdrawal line, as a function of values of said blood parameter measured in the withdrawal line.

29. (New) A device according to claim 28, wherein said determining means comprises means for calculating a blood recirculation value as a function of at least first and second values of said blood parameter in the blood flowing in the

withdrawal line, said first value being measured during a first cycle of increase and decrease of said succession, and said second value being measured during a second cycle of increase and decrease of said succession.

30. (New) A device according to claim 28, wherein said determining means comprises means for calculating a blood recirculation value as a function of at least first and second values of said blood parameter in the blood flowing in the return line, said first value being acquired during a first cycle of increase and decrease of said succession, and said second value being acquired during a second cycle of increase and decrease of said succession.

31. (New) A device according to claim 28, wherein said determining means comprises means for calculating a blood recirculation value by means of a linear first order model, said model having parameters estimated using a method of least squares.

32. (New) A device according to claim 28, wherein said inducing means are predisposed for inducing continuously said succession.

33. (New) A device according to claim 28, wherein said determining means comprises means for calculating a blood recirculation value on the basis of a series of values assumed by said blood parameter within a predetermined time window.

34. (New) A device for determining blood recirculation comprising:
a withdrawal line for withdrawing blood from a patient's body;
a return line for returning blood into the patient's body;

means for inducing a succession of variations of a value of a blood parameter in the blood flowing in the return line, each variation having an increase and a decrease of said blood parameter value;

means for acquiring at least a first value and at least a second value of said blood parameter in the blood flowing in the withdrawal line for at least a first and, respectively, a second of said variations; and

means for determining a blood recirculation value in a vascular access of the patient between the return line and the withdrawal line, as a function of said first acquired value and said second acquired value.

35. (New) A device according to claim 34, wherein said acquiring means are predisposed for measuring said first value and said second value during the first and, respectively, the second of said variations.

36. (New) A device according to claim 34, wherein said determining means comprises means for calculating a blood recirculation value as a function of at least a first value and a second value of said blood parameter in the blood flowing in the return line for at least a first and, respectively, a second of said variations.

37. (New) A device according to claim 36, wherein said first and second values of said blood parameter of the blood flowing in the return line are measured values or set values.

38. (New) A device for determining blood recirculation comprising:

a withdrawal line for withdrawing blood from a patient's body;

a return line for returning blood into the patient's body;

means for inducing a succession of variations of a value of a blood parameter in the blood flowing in the return line, each

variation comprising an increase and a decrease of said blood parameter value;

means for acquiring, for each variation, at least a first value of said blood parameter of the blood flowing in the return line and at least a first value of said blood parameter of the blood flowing in the withdrawal line; and

means for determining a blood recirculation value in a vascular access of the patient between the return line and the withdrawal line, as a function of said blood parameter values that were acquired for a variation and for one or more temporally preceding variations.

39. (New) A device according to claim 38, wherein said acquired values of said parameter of the blood flowing in the return line are measured values or set values.

40. (New) A device according to one of claims 28, 34, or 38, wherein said blood parameter is either hemoglobin concentration or blood temperature.

41. (New) A device according to one of claims 28, 34, or 38, wherein said inducing means comprises at least one of:

means for controlling a variation of an ultrafiltration flow in a blood treatment device arranged between the withdrawal line and the return line; and

means for controlling a variation of an infusion flow into the extracorporeal blood.

42. (New) A device for determining blood recirculation in a vascular access of a patient undergoing a dialysis treatment comprising:

a withdrawal line for withdrawing blood from the patient's body;

a dialysis filter;

a return line for returning blood into the patient's body;

means for causing a succession of changes of hemoglobin concentration of the blood flowing in the return line;

means for acquiring, for each change, a value of the hemoglobin concentration of the blood flowing in the return line and a value of the hemoglobin concentration of the blood flowing in the withdrawal line; and

means for determining a blood recirculation value in the vascular access between the return line and the withdrawal line, as a function of the values of the hemoglobin concentration of the blood, said hemoglobin concentration values being acquired due to a change and to temporally preceding changes.

43. (New) A device according to claim 42, wherein said means for determining a blood recirculation value further comprises means for calculating the recirculation by means of a linear first-order model, said model having parameters estimated using a method of least squares.